

Grid

The Grid system is a comprehensive CSS-based layout framework that provides responsive, mobile-first grid classes for building flexible and adaptive layouts. Based on Bootstrap's flexbox grid system, it includes containers, rows, columns, and extensive flexbox utilities with breakpoint-specific behavior.

How to use

The Grid system is implemented as CSS classes that can be applied directly to HTML elements. No JavaScript or Angular components are required.

Basic Grid

Simple grid layout with equal-width columns.

```
&lt;div class="container"&gt;  
  &lt;div class="row"&gt;  
    &lt;div class="col-md-6"&gt;Column 1&lt;/div&gt;  
    &lt;div class="col-md-6"&gt;Column 2&lt;/div&gt;  
  &lt;/div&gt;  
&lt;/div&gt;
```

Responsive Grid

Grid layout that adapts to different screen sizes using breakpoint-specific classes.

```

<div class="grid-basic-demo">
  <h3>Basic Grid Layout</h3>

  <div class="demo-section">
    <h4>Equal Width Columns</h4>
    <p>
      Basic grid with equal-width columns using the <code>.col</code> class.
    </p>

    <div class="container">
      <div class="row">
        <div class="col">
          <div class="grid-item">
            <h5>Column 1</h5>
            <p>This column automatically sizes to fill available space.</p>
          </div>
        </div>
        <div class="col">
          <div class="grid-item">
            <h5>Column 2</h5>
            <p>This column also automatically sizes to fill available space.</p>
          </div>
        </div>
        <div class="col">
          <div class="grid-item">
            <h5>Column 3</h5>
            <p>All columns in this row have equal width.</p>
          </div>
        </div>
      </div>
    </div>
  </div>

  <div class="demo-section">
    <h4>Fixed Width Columns</h4>
    <p>Grid with specific column widths using numbered classes.</p>

    <div class="container">
      <div class="row">
        <div class="col-8">
          <div class="grid-item primary">
            <h5>Main Content (8/12)</h5>
            <p>This column takes up 8 out of 12 grid columns (66.67% width).</p>
          </div>
        </div>
        <div class="col-4">
          <div class="grid-item secondary">
            <h5>Sidebar (4/12)</h5>
            <p>This column takes up 4 out of 12 grid columns (33.33% width).</p>
          </div>
        </div>
      </div>
    </div>
  </div>

```

```

<div>

<div class="demo-section">
  <h4>Mixed Column Types</h4>
  <p>Combining fixed-width and auto-width columns.</p>

  <div class="container">
    <div class="row">
      <div class="col-6">
        <div class="grid-item">
          <h5>Fixed Width (6/12)</h5>
          <p>This column has a fixed width of 50%.</p>
        </div>
      </div>
      <div class="col">
        <div class="grid-item">
          <h5>Auto Width</h5>
          <p>This column automatically sizes to fill remaining space.</p>
        </div>
      </div>
      <div class="col-auto">
        <div class="grid-item compact">
          <h5>Auto Size</h5>
          <p>Fits content.</p>
        </div>
      </div>
    </div>
  </div>

<div class="demo-section">
  <h4>Container Types</h4>
  <p>Different container types for different layout needs.</p>

  <div class="container">
    <div class="row">
      <div class="col-12">
        <div class="grid-item">
          <h5>Fixed Container</h5>
          <p>
            This uses <code>.container</code> with responsive max-widths and
            centered content.
          </p>
        </div>
      </div>
    </div>
  </div>

<div class="container-fluid">
  <div class="row">
    <div class="col-12">
      <div class="grid-item fluid">
        <h5>Fluid Container</h5>
      </div>
    </div>
  </div>
</div>

```

```

<p>
    This uses <code>.container-fluid</code> for full-width layout
    spanning the entire viewport.
</p>
</div>
</div>
</div>
</div>
</div>

<div class="demo-section">
    <h4>No Gutters</h4>
    <p>Grid without gutters using the <code>.no-gutters</code> class.</p>

    <div class="container">
        <div class="row no-gutters">
            <div class="col-4">
                <div class="grid-item no-gutter">
                    <h5>No Gutter</h5>
                    <p>This column has no spacing between it and adjacent columns.</p>
                </div>
            </div>
            <div class="col-4">
                <div class="grid-item no-gutter">
                    <h5>No Gutter</h5>
                    <p>Adjacent columns touch each other with no gap.</p>
                </div>
            </div>
            <div class="col-4">
                <div class="grid-item no-gutter">
                    <h5>No Gutter</h5>
                    <p>Perfect for seamless layouts and full-width designs.</p>
                </div>
            </div>
        </div>
    </div>

```

<div class="demo-info">

- <h4>Basic Grid Features</h4>
-
 -
 Container System: Fixed-width and fluid containers

 Row Wrapper: Flexbox rows with automatic gutter management

 Column Classes: Equal-width, fixed-width, and auto-width options


```
&lt;strong&gt;No Gutters:&lt;/strong&gt; Option to remove spacing between columns  
&lt;/li&gt;  
&lt;li&gt;  
  &lt;strong&gt;Responsive Foundation:&lt;/strong&gt; Mobile-first approach with  
  responsive breakpoints  
&lt;/li&gt;  
&lt;/ul&gt;  
&lt;/div&gt;  
&lt;/div&gt;
```

Flexbox Utilities

Advanced flexbox utilities for controlling layout direction, alignment, and spacing.

```

import { Component } from "@angular/core";

@Component({
  selector: "app-grid-basic",
  standalone: true,
  template: `
    <div class="grid-basic-demo">
      <h3>Basic Grid Layout</h3>

      <div class="demo-section">
        <h4>Equal Width Columns</h4>
        <p>
          Basic grid with equal-width columns using the <code>.col</code> class.
        </p>

        <div class="container">
          <div class="row">
            <div class="col">
              <div class="grid-item">
                <h5>Column 1</h5>
                <p>This column automatically sizes to fill available space.</p>
              </div>
            </div>
            <div class="col">
              <div class="grid-item">
                <h5>Column 2</h5>
                <p>
                  This column also automatically sizes to fill available space.
                </p>
              </div>
            </div>
            <div class="col">
              <div class="grid-item">
                <h5>Column 3</h5>
                <p>All columns in this row have equal width.</p>
              </div>
            </div>
          </div>
        </div>
      </div>

      <div class="demo-section">
        <h4>Fixed Width Columns</h4>
        <p>
          Grid with specific column widths using numbered classes.
        </p>

        <div class="container">
          <div class="row">
            <div class="col-8">
              <div class="grid-item primary">
                <h5>Main Content (8/12)</h5>
                <p>
                  This column takes up 8 out of 12 grid columns (66.67% width).
                </p>
              </div>
            </div>
          </div>
        </div>
      </div>
    </div>
  `
```

```

    &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;div class="col-4"&gt;
        &lt;div class="grid-item secondary"&gt;
            &lt;h5&gt;Sidebar (4/12)&lt;/h5&gt;
            &lt;p&gt;
                This column takes up 4 out of 12 grid columns (33.33% width).
            &lt;/p&gt;
        &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;/div&ampgt

&lt;div class="demo-section"&gt;
    &lt;h4&gt;Mixed Column Types&lt;/h4&gt;
    &lt;p&gt;Combining fixed-width and auto-width columns.&lt;/p&gt;

    &lt;div class="container"&gt;
        &lt;div class="row"&gt;
            &lt;div class="col-6"&gt;
                &lt;div class="grid-item"&gt;
                    &lt;h5&gt;Fixed Width (6/12)&lt;/h5&gt;
                    &lt;p&gt;This column has a fixed width of 50%.&lt;/p&gt;
                &lt;/div&ampgt
            &lt;/div&ampgt
            &lt;div class="col"&gt;
                &lt;div class="grid-item"&gt;
                    &lt;h5&gt;Auto Width&lt;/h5&gt;
                    &lt;p&gt;This column automatically sizes to fill remaining space.&lt;/p&gt;
                &lt;/div&ampgt
            &lt;/div&ampgt
            &lt;div class="col-auto"&gt;
                &lt;div class="grid-item compact"&gt;
                    &lt;h5&gt;Auto Size&lt;/h5&gt;
                    &lt;p&gt;Fits content.&lt;/p&gt;
                &lt;/div&ampgt
            &lt;/div&ampgt
            &lt;/div&ampgt
        &lt;/div&ampgt
        &lt;div class="col-12"&gt;
            &lt;div class="grid-item"&gt;
                &lt;h5&gt;Fixed Container&lt;/h5&gt;
                &lt;p&gt;
                    This uses &lt;code&gt;.container&lt;/code&gt; with responsive max-widths
                &lt;/p&gt;
            &lt;/div&ampgt
        &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;/div&ampgt

```

```

        and centered content.

</p>
</div>
</div>
</div>
</div>

<div class="container-fluid">
<div class="row">
<div class="col-12">
<div class="grid-item fluid">
<h5>Fluid Container</h5>
<p>
    This uses <code>.container-fluid</code> for full-width layout
    spanning the entire viewport.
</p>
</div>
</div>
</div>
</div>
</div>

<div class="demo-section">
<h4>No Gutters</h4>
<p>Grid without gutters using the <code>.no-gutters</code> class.</p>
<div class="container">
<div class="row no-gutters">
<div class="col-4">
<div class="grid-item no-gutter">
<h5>No Gutter</h5>
<p>
    This column has no spacing between it and adjacent columns.
</p>
</div>
</div>
<div class="col-4">
<div class="grid-item no-gutter">
<h5>No Gutter</h5>
<p>Adjacent columns touch each other with no gap.</p>
</div>
</div>
<div class="col-4">
<div class="grid-item no-gutter">
<h5>No Gutter</h5>
<p>Perfect for seamless layouts and full-width designs.</p>
</div>
</div>
</div>
</div>
</div>

<div class="demo-info">

```

```

<h4>Basic Grid Features</h4>
<ul>
  <li>
    <strong>Container System:</strong> Fixed-width and fluid containers
  </li>
  <li>
    <strong>Row Wrapper:</strong> Flexbox rows with automatic gutter
    management
  </li>
  <li>
    <strong>Column Classes:</strong> Equal-width, fixed-width, and
    auto-width options
  </li>
  <li>
    <strong>No Gutters:</strong> Option to remove spacing between
    columns
  </li>
  <li>
    <strong>Responsive Foundation:</strong> Mobile-first approach with
    responsive breakpoints
  </li>
</ul>
</div>
</div>

,
styles: [
  .grid-basic-demo {
    padding: 20px;
    max-width: 1200px;
    margin: 0 auto;
  }

  .grid-basic-demo h3 {
    margin: 0 0 20px 0;
    color: #333;
    font-size: 24px;
    font-weight: 600;
  }

  .demo-section {
    margin-bottom: 40px;
    padding: 20px;
    border: 1px solid #e5e7eb;
    border-radius: 8px;
    background: #f9fafb;
  }

  .demo-section h4 {
    margin: 0 0 12px 0;
    color: #333;
    font-size: 18px;
    font-weight: 600;
  }
]

```

```
}

.demo-section p {
  margin: 0 0 20px 0;
  color: #555;
  line-height: 1.5;
}

.demo-section code {
  background: #f1f3f4;
  padding: 2px 6px;
  border-radius: 4px;
  font-family: monospace;
  font-size: 14px;
}

.grid-item {
  background: #fff;
  border: 1px solid #e5e7eb;
  border-radius: 6px;
  padding: 20px;
  height: 100%;
  min-height: 120px;
  display: flex;
  flex-direction: column;
  justify-content: center;
}

.grid-item h5 {
  margin: 0 0 12px 0;
  color: #333;
  font-size: 16px;
  font-weight: 600;
}

.grid-item p {
  margin: 0;
  color: #666;
  line-height: 1.4;
}

.grid-item.primary {
  background: #e3f2fd;
  border-color: #2196f3;
}

.grid-item.secondary {
  background: #f3e5f5;
  border-color: #9c27b0;
}

.grid-item.compact {
  min-height: 80px;
```

```
padding: 15px;
}

.grid-item.fluid {
  background: #e8f5e8;
  border-color: #4caf50;
}

.grid-item.no-gutter {
  border-radius: 0;
  border-left: none;
}

.grid-item.no-gutter:first-child {
  border-left: 1px solid #e5e7eb;
  border-top-left-radius: 6px;
  border-bottom-left-radius: 6px;
}

.grid-item.no-gutter:last-child {
  border-top-right-radius: 6px;
  border-bottom-right-radius: 6px;
}

.demo-info {
  margin-top: 40px;
  padding: 20px;
  background: #f8f9fa;
  border: 1px solid #dee2e6;
  border-radius: 8px;
}

.demo-info h4 {
  margin: 0 0 16px 0;
  color: #333;
  font-size: 18px;
  font-weight: 600;
}

.demo-info ul {
  margin: 0;
  padding-left: 20px;
  color: #555;
}

.demo-info li {
  margin-bottom: 8px;
  line-height: 1.4;
}

.demo-info strong {
  color: #333;
}
```

```
        `,
    ],
})
export class GridBasicComponent {
  constructor() {
    console.log("Grid Basic Component initialized");
  }
}
```

Alignment

Flexbox alignment utilities for controlling how items are positioned within containers.

```

<div class="grid-responsive-demo">
  <h3>Responsive Grid Layout</h3>

  <div class="demo-section">
    <h4>Responsive Column Classes</h4>
    <p>
      Grid columns that adapt to different screen sizes using
      breakpoint-specific classes.
    </p>

    <div class="container">
      <div class="row">
        <div class="col-12 col-sm-6 col-md-4 col-lg-3">
          <div class="grid-item responsive">
            <h5>Responsive Column</h5>
            <p>
              &lt;strong&gt;Mobile:&lt;/strong&gt; 12/12 (100%)&lt;br /&gt;
              &lt;strong&gt;Small:&lt;/strong&gt; 6/12 (50%)&lt;br /&gt;
              &lt;strong&gt;Medium:&lt;/strong&gt; 4/12 (33.33%)&lt;br /&gt;
              &lt;strong&gt;Large:&lt;/strong&gt; 3/12 (25%)
            </p>
          </div>
        </div>
        <div class="col-12 col-sm-6 col-md-4 col-lg-3">
          <div class="grid-item responsive">
            <h5>Responsive Column</h5>
            <p>
              &lt;strong&gt;Mobile:&lt;/strong&gt; 12/12 (100%)&lt;br /&gt;
              &lt;strong&gt;Small:&lt;/strong&gt; 6/12 (50%)&lt;br /&gt;
              &lt;strong&gt;Medium:&lt;/strong&gt; 4/12 (33.33%)&lt;br /&gt;
              &lt;strong&gt;Large:&lt;/strong&gt; 3/12 (25%)
            </p>
          </div>
        </div>
        <div class="col-12 col-sm-6 col-md-4 col-lg-3">
          <div class="grid-item responsive">
            <h5>Responsive Column</h5>
            <p>
              &lt;strong&gt;Mobile:&lt;/strong&gt; 12/12 (100%)&lt;br /&gt;
              &lt;strong&gt;Small:&lt;/strong&gt; 6/12 (50%)&lt;br /&gt;
              &lt;strong&gt;Medium:&lt;/strong&gt; 4/12 (33.33%)&lt;br /&gt;
              &lt;strong&gt;Large:&lt;/strong&gt; 3/12 (25%)
            </p>
          </div>
        </div>
        <div class="col-12 col-sm-6 col-md-4 col-lg-3">
          <div class="grid-item responsive">
            <h5>Responsive Column</h5>
            <p>
              &lt;strong&gt;Mobile:&lt;/strong&gt; 12/12 (100%)&lt;br /&gt;
              &lt;strong&gt;Small:&lt;/strong&gt; 6/12 (50%)&lt;br /&gt;
              &lt;strong&gt;Medium:&lt;/strong&gt; 4/12 (33.33%)&lt;br /&gt;
              &lt;strong&gt;Large:&lt;/strong&gt; 3/12 (25%)
            </p>
          </div>
        </div>
      </div>
    </div>
  </div>

```

```

    &lt;/p&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;

&lt;div class="demo-section"&gt;
    &lt;h4&gt;Mobile-First Layout&lt;/h4&gt;
    &lt;p&gt;
        Layout that starts with mobile design and progressively enhances for
        larger screens.
    &lt;/p&gt;

    &lt;div class="container"&gt;
        &lt;div class="row"&gt;
            &lt;div class="col-12 col-md-8"&gt;
                &lt;div class="grid-item primary"&gt;
                    &lt;h5&gt;Main Content&lt;/h5&gt;
                    &lt;p&gt;
                        &lt;strong&gt;Mobile:&lt;/strong&gt; Full width (12/12)&lt;br /&gt;
                        &lt;strong&gt;Medium+:&lt;/strong&gt; 8/12 width
                    &lt;/p&gt;
                    &lt;p&gt;
                        This column takes full width on mobile devices and 8/12 width on
                        medium screens and larger.
                    &lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12 col-md-4"&gt;
                &lt;div class="grid-item secondary"&gt;
                    &lt;h5&gt;Sidebar&lt;/h5&gt;
                    &lt;p&gt;
                        &lt;strong&gt;Mobile:&lt;/strong&gt; Full width (12/12)&lt;br /&gt;
                        &lt;strong&gt;Medium+:&lt;/strong&gt; 4/12 width
                    &lt;/p&gt;
                    &lt;p&gt;
                        This sidebar appears below the main content on mobile and beside
                        it on larger screens.
                    &lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
        &lt;/div&gt;
    &lt;/div&gt;

```

<div class="demo-section">

<h4>Complex Responsive Layout</h4>

<p>

Advanced responsive layout with different column configurations at each breakpoint.

</p>

<div class="container">

```

<div class="row">
    <div class="col-12 col-sm-6 col-lg-4">
        <div class="grid-item">
            <h5>Feature 1</h5>
            <p>
                <strong>Mobile:</strong> 12/12 (100%)<br />
                <strong>Small:</strong> 6/12 (50%)<br />
                <strong>Large:</strong> 4/12 (33.33%)
            </p>
        </div>
    </div>
    <div class="col-12 col-sm-6 col-lg-4">
        <div class="grid-item">
            <h5>Feature 2</h5>
            <p>
                <strong>Mobile:</strong> 12/12 (100%)<br />
                <strong>Small:</strong> 6/12 (50%)<br />
                <strong>Large:</strong> 4/12 (33.33%)
            </p>
        </div>
    </div>
    <div class="col-12 col-sm-12 col-lg-4">
        <div class="grid-item">
            <h5>Feature 3</h5>
            <p>
                <strong>Mobile:</strong> 12/12 (100%)<br />
                <strong>Small:</strong> 12/12 (100%)<br />
                <strong>Large:</strong> 4/12 (33.33%)
            </p>
        </div>
    </div>
</div>

<div class="demo-section">
    <h4>Responsive Navigation</h4>
    <p>Navigation layout that adapts to different screen sizes.</p>

    <div class="container">
        <div class="row align-items-center">
            <div class="col-12 col-md-3">
                <div class="grid-item nav-brand">
                    <h5>Brand Logo</h5>
                    <p>Always full width on mobile, 3/12 on medium+</p>
                </div>
            </div>
            <div class="col-12 col-md-9">
                <div class="grid-item nav-menu">
                    <h5>Navigation Menu</h5>
                    <p>Full width on mobile, 9/12 on medium+</p>
                </div>
                <div class="nav-items">
                    <span class="nav-item">Home</span>

```

```

        &lt;span class="nav-item"&gt;About&lt;/span&gt;
        &lt;span class="nav-item"&gt;Services&lt;/span&gt;
        &lt;span class="nav-item"&gt;Contact&lt;/span&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;

&lt;div class="demo-section"&gt;
    &lt;h4&gt;Responsive Form Layout&lt;/h4&gt;
    &lt;p&gt;
        Form fields that stack on mobile and align side-by-side on larger screens.
    &lt;/p&gt;

    &lt;div class="container"&gt;
        &lt;div class="row"&gt;
            &lt;div class="col-12 col-sm-6"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;First Name&lt;/h5&gt;
                    &lt;p&gt;Full width on mobile, 6/12 on small+&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12 col-sm-6"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;Last Name&lt;/h5&gt;
                    &lt;p&gt;Full width on mobile, 6/12 on small+&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;Email Address&lt;/h5&gt;
                    &lt;p&gt;Always full width across all screen sizes&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12 col-md-8"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;Message&lt;/h5&gt;
                    &lt;p&gt;Full width on mobile, 8/12 on medium+&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12 col-md-4"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;Submit&lt;/h5&gt;
                    &lt;p&gt;Full width on mobile, 4/12 on medium+&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
        &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;

&lt;div class="demo-info"&gt;

```

```

<h4>Responsive Grid Features</h4>
<ul>
  <li>
    <strong>Mobile-First:</strong> Design for mobile devices first, then
    enhance for larger screens
  </li>
  <li>
    <strong>Breakpoint Classes:</strong> Use <code>.col-sm-*</code>, <code>.col-md-*</code>, <code>.col-lg-*</code>, <code>.col-xl-*</code>
  </li>
  <li>
    <strong>Progressive Enhancement:</strong> Start with basic layout, add
    complexity for larger screens
  </li>
  <li>
    <strong>Content Priority:</strong> Ensure important content is visible
    on all screen sizes
  </li>
  <li>
    <strong>Touch Optimization:</strong> Layouts are optimized for touch
    interaction on mobile
  </li>
</ul>

<h4>Breakpoint Reference</h4>
<ul>
  <li>
    <strong>Extra Small (xs):</strong> 0px and up (default, no prefix)
  </li>
  <li>
    <strong>Small (sm):</strong> 576px and up</li>
  <li>
    <strong>Medium (md):</strong> 768px and up</li>
  <li>
    <strong>Large (lg):</strong> 992px and up</li>
  <li>
    <strong>Extra Large (xl):</strong> 1200px and up</li>
</ul>
</div>
</div>

```

Ordering

CSS order utilities for controlling the visual order of flex items.

```

import { Component } from "@angular/core";

@Component({
  selector: "app-grid-responsive",
  standalone: true,
  template: `
    <div class="grid-responsive-demo">
      <h3>Responsive Grid Layout</h3>

      <div class="demo-section">
        <h4>Responsive Column Classes</h4>
        <p>
          Grid columns that adapt to different screen sizes using
          breakpoint-specific classes.
        </p>

        <div class="container">
          <div class="row">
            <div class="col-12 col-sm-6 col-md-4 col-lg-3">
              <div class="grid-item responsive">
                <h5>Responsive Column</h5>
                <p>
                  <strong>Mobile:</strong> 12/12 (100%)<br />
                  <strong>Small:</strong> 6/12 (50%)<br />
                  <strong>Medium:</strong> 4/12 (33.33%)<br />
                  <strong>Large:</strong> 3/12 (25%)
                </p>
              </div>
            </div>
            <div class="col-12 col-sm-6 col-md-4 col-lg-3">
              <div class="grid-item responsive">
                <h5>Responsive Column</h5>
                <p>
                  <strong>Mobile:</strong> 12/12 (100%)<br />
                  <strong>Small:</strong> 6/12 (50%)<br />
                  <strong>Medium:</strong> 4/12 (33.33%)<br />
                  <strong>Large:</strong> 3/12 (25%)
                </p>
              </div>
            </div>
            <div class="col-12 col-sm-6 col-md-4 col-lg-3">
              <div class="grid-item responsive">
                <h5>Responsive Column</h5>
                <p>
                  <strong>Mobile:</strong> 12/12 (100%)<br />
                  <strong>Small:</strong> 6/12 (50%)<br />
                  <strong>Medium:</strong> 4/12 (33.33%)<br />
                  <strong>Large:</strong> 3/12 (25%)
                </p>
              </div>
            </div>
          </div>
        </div>
      </div>
    </div>
  `
})

```

```

<h5>Responsive Column</h5>
<p>
    <strong>Mobile:</strong> 12/12 (100%)<br />
    <strong>Small:</strong> 6/12 (50%)<br />
    <strong>Medium:</strong> 4/12 (33.33%)<br />
    <strong>Large:</strong> 3/12 (25%)
</p>
</div>
</div>
</div>
</div>

<div class="demo-section">
<h4>Mobile-First Layout</h4>
<p>
    Layout that starts with mobile design and progressively enhances for
    larger screens.
</p>

<div class="container">
    <div class="row">
        <div class="col-12 col-md-8">
            <div class="grid-item primary">
                <h5>Main Content</h5>
                <p>
                    <strong>Mobile:</strong> Full width (12/12)<br />
                    <strong>Medium+:</strong> 8/12 width
                </p>
                <p>
                    This column takes full width on mobile devices and 8/12 width
                    on medium screens and larger.
                </p>
            </div>
            <div class="grid-item secondary">
                <h5>Sidebar</h5>
                <p>
                    <strong>Mobile:</strong> Full width (12/12)<br />
                    <strong>Medium+:</strong> 4/12 width
                </p>
                <p>
                    This sidebar appears below the main content on mobile and
                    beside it on larger screens.
                </p>
            </div>
        </div>
        <div class="col-12 col-md-4">
            <div class="grid-item tertiary">
                <h5>Footer</h5>
                <p>
                    <strong>Mobile:</strong> Full width (12/12)<br />
                    <strong>Medium+:</strong> 4/12 width
                </p>
                <p>
                    This footer appears below the sidebar on mobile and
                    beside it on larger screens.
                </p>
            </div>
        </div>
    </div>
</div>
</div>

<div class="demo-section">

```

```

<h4>Complex Responsive Layout</h4>
<p>
    Advanced responsive layout with different column configurations at
    each breakpoint.
</p>

<div class="container">
    <div class="row">
        <div class="col-12 col-sm-6 col-lg-4">
            <div class="grid-item">
                <h5>Feature 1</h5>
                <p>
                    <strong>Mobile:</strong> 12/12 (100%)<br />
                    <strong>Small:</strong> 6/12 (50%)<br />
                    <strong>Large:</strong> 4/12 (33.33%)<br />
                </p>
            </div>
        </div>
        <div class="col-12 col-sm-6 col-lg-4">
            <div class="grid-item">
                <h5>Feature 2</h5>
                <p>
                    <strong>Mobile:</strong> 12/12 (100%)<br />
                    <strong>Small:</strong> 6/12 (50%)<br />
                    <strong>Large:</strong> 4/12 (33.33%)<br />
                </p>
            </div>
        </div>
        <div class="col-12 col-sm-12 col-lg-4">
            <div class="grid-item">
                <h5>Feature 3</h5>
                <p>
                    <strong>Mobile:</strong> 12/12 (100%)<br />
                    <strong>Small:</strong> 12/12 (100%)<br />
                    <strong>Large:</strong> 4/12 (33.33%)<br />
                </p>
            </div>
        </div>
    </div>
</div>

<div class="demo-section">
    <h4>Responsive Navigation</h4>
    <p>Navigation layout that adapts to different screen sizes.</p>

    <div class="container">
        <div class="row align-items-center">
            <div class="col-12 col-md-3">
                <div class="grid-item nav-brand">
                    <h5>Brand Logo</h5>
                    <p>Always full width on mobile, 3/12 on medium+</p>
                </div>
            </div>
        </div>
    </div>
</div>

```

```

</div>
<div class="col-12 col-md-9">
    <div class="grid-item nav-menu">
        <h5>Navigation Menu</h5>
        <p>Full width on mobile, 9/12 on medium+</p>
        <div class="nav-items">
            <span class="nav-item">Home</span>
            <span class="nav-item">About</span>
            <span class="nav-item">Services</span>
            <span class="nav-item">Contact</span>
        </div>
    </div>
    <div>
        <div>
            <div>
                <div>
                    <div>
                        <div>
                            <div>
                                <div>
                                    <div>
                                        <div>
                                            <div>
                                                <div>
                                                    <div>
                                                        <div>
                                                            <div>
                                                                <div>
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                                                                                        <div>
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                                                                                                                                        <div>
                                                                                                                                            <div>
                                                                                                                                                <div>
                                                                                                                                                    <div>
                                                                ................................................................

```

```

        &lt;p&gt;Full width on mobile, 4/12 on medium+&lt;/p&gt;
        &lt;/div&gt;
        &lt;/div&gt;
        &lt;/div&gt;
        &lt;/div&gt;
        &lt;/div&gt;

&lt;div class="demo-info"&gt;
    &lt;h4&gt;Responsive Grid Features&lt;/h4&gt;
    &lt;ul&gt;
        &lt;li&gt;
            &lt;strong&gt;Mobile-First:&lt;/strong&gt; Design for mobile devices first, then
            enhance for larger screens
        &lt;/li&gt;
        &lt;li&gt;
            &lt;strong&gt;Breakpoint Classes:&lt;/strong&gt; Use &lt;code&gt;.col-sm-*&lt;/code&gt;,
            &lt;code&gt;.col-md-*&lt;/code&gt;, &lt;code&gt;.col-lg-*&lt;/code&gt;,
            &lt;code&gt;.col-xl-*&lt;/code&gt;
        &lt;/li&gt;
        &lt;li&gt;
            &lt;strong&gt;Progressive Enhancement:&lt;/strong&gt; Start with basic layout,
            add complexity for larger screens
        &lt;/li&gt;
        &lt;li&gt;
            &lt;strong&gt;Content Priority:&lt;/strong&gt; Ensure important content is
            visible on all screen sizes
        &lt;/li&gt;
        &lt;li&gt;
            &lt;strong&gt;Touch Optimization:&lt;/strong&gt; Layouts are optimized for touch
            interaction on mobile
        &lt;/li&gt;
    &lt;/ul&gt;

    &lt;h4&gt;Breakpoint Reference&lt;/h4&gt;
    &lt;ul&gt;
        &lt;li&gt;
            &lt;strong&gt;Extra Small (xs):&lt;/strong&gt; 0px and up (default, no prefix)
        &lt;/li&gt;
        &lt;li&gt;&lt;strong&gt;Small (sm):&lt;/strong&gt; 576px and up&lt;/li&gt;
        &lt;li&gt;&lt;strong&gt;Medium (md):&lt;/strong&gt; 768px and up&lt;/li&gt;
        &lt;li&gt;&lt;strong&gt;Large (lg):&lt;/strong&gt; 992px and up&lt;/li&gt;
        &lt;li&gt;&lt;strong&gt;Extra Large (xl):&lt;/strong&gt; 1200px and up&lt;/li&gt;
    &lt;/ul&gt;
    &lt;/div&gt;
&lt;/div&gt;

``,
styles: [
```
.grid-responsive-demo {
 padding: 20px;
 max-width: 1200px;
 margin: 0 auto;
}

```

```
.grid-responsive-demo h3 {
 margin: 0 0 20px 0;
 color: #333;
 font-size: 24px;
 font-weight: 600;
}

.demo-section {
 margin-bottom: 40px;
 padding: 20px;
 border: 1px solid #e5e7eb;
 border-radius: 8px;
 background: #f9fafb;
}

.demo-section h4 {
 margin: 0 0 12px 0;
 color: #333;
 font-size: 18px;
 font-weight: 600;
}

.demo-section p {
 margin: 0 0 20px 0;
 color: #555;
 line-height: 1.5;
}

.demo-section code {
 background: #f1f3f4;
 padding: 2px 6px;
 border-radius: 4px;
 font-family: monospace;
 font-size: 14px;
}

.grid-item {
 background: #fff;
 border: 1px solid #e5e7eb;
 border-radius: 6px;
 padding: 20px;
 height: 100%;
 min-height: 120px;
 display: flex;
 flex-direction: column;
 justify-content: center;
}

.grid-item h5 {
 margin: 0 0 12px 0;
 color: #333;
 font-size: 16px;
 font-weight: 600;
```

```
}

.grid-item p {
 margin: 0;
 color: #666;
 line-height: 1.4;
}

.grid-item.responsive {
 background: #fff3cd;
 border-color: #ffc107;
}

.grid-item.primary {
 background: #e3f2fd;
 border-color: #2196f3;
}

.grid-item.secondary {
 background: #f3e5f5;
 border-color: #9c27b0;
}

.grid-item.nav-brand {
 background: #e8f5e8;
 border-color: #4caf50;
 min-height: 80px;
}

.grid-item.nav-menu {
 background: #fff8e1;
 border-color: #ff9800;
 min-height: 80px;
}

.nav-items {
 display: flex;
 gap: 15px;
 margin-top: 10px;
}

.nav-item {
 background: #ff9800;
 color: white;
 padding: 5px 10px;
 border-radius: 4px;
 font-size: 14px;
}

.grid-item.form-field {
 background: #f8f9fa;
 border-color: #6c757d;
 min-height: 100px;
}
```

```

 }

.demo-info {
 margin-top: 40px;
 padding: 20px;
 background: #f8f9fa;
 border: 1px solid #dee2e6;
 border-radius: 8px;
}

.demo-info h4 {
 margin: 0 0 16px 0;
 color: #333;
 font-size: 18px;
 font-weight: 600;
}

.demo-info ul {
 margin: 0 0 20px 0;
 padding-left: 20px;
 color: #555;
}

.demo-info li {
 margin-bottom: 8px;
 line-height: 1.4;
}

.demo-info strong {
 color: #333;
}

),
],
})
export class GridResponsiveComponent {
 constructor() {
 console.log("Grid Responsive Component initialized");
 }
}

```

## Features

### Container System

- Fixed Container : .container with responsive max-widths
- Fluid Container : .container-fluid for full-width layouts
- Responsive Breakpoints : Automatic width adjustments at different screen sizes
- Consistent Padding : 15px horizontal padding on all containers

# Row System

- Flexbox Rows : .row creates flex containers with wrap enabled
- Negative Margins : Automatic gutter compensation with -15px margins
- No Gutters : .no-gutters class removes spacing between columns
- Responsive Behavior : Consistent behavior across all breakpoints

# Column System

- 12-Column Grid : Standard 12-column layout system
- Responsive Classes : Breakpoint-specific column classes (sm, md, lg, xl)
- Auto Columns : .col and .col-auto for flexible sizing
- Fixed Widths : Classes from .col-1 to .col-12 for precise control

# Breakpoint System

- Extra Small (xs) : Default, no prefix (0px and up)
- Small (sm) : 576px and up
- Medium (md) : 768px and up
- Large (lg) : 992px and up
- Extra Large (xl) : 1200px and up

# Flexbox Utilities

- Direction : Row, column, and reverse variants
- Wrap : Wrap, nowrap, and wrap-reverse options
- Justify Content : Start, end, center, between, around
- Align Items : Start, end, center, baseline, stretch
- Align Content : Start, end, center, between, around, stretch
- Align Self : Auto, start, end, center, baseline, stretch

# Positioning Utilities

- Offsets : .offset-\* classes for column positioning
- Push/Pull : .push-\* and .pull-\* for reordering
- Order : .order-\* classes for flex item ordering
- Responsive Variants : All utilities available at each breakpoint

# CSS Classes

# Container Classes

| Class            | Description                                       |
|------------------|---------------------------------------------------|
| .container       | Fixed-width container with responsive max-widths  |
| .container-fluid | Full-width container spanning the entire viewport |

# Row Classes

| Class       | Description                              |
|-------------|------------------------------------------|
| .row        | Flexbox row container with wrap enabled  |
| .no-gutters | Removes gutters from row and its columns |

# Column Classes

## Basic Columns

| Class     | Width   | Description                                 |
|-----------|---------|---------------------------------------------|
| .col      | Auto    | Equal-width column that grows to fill space |
| .col-auto | Auto    | Column sized to content                     |
| .col-1    | 8.333%  | 1/12 width column                           |
| .col-2    | 16.667% | 2/12 width column                           |
| .col-3    | 25%     | 3/12 width column                           |
| .col-4    | 33.333% | 4/12 width column                           |
| .col-5    | 41.667% | 5/12 width column                           |
| .col-6    | 50%     | 6/12 width column                           |
| .col-7    | 58.333% | 7/12 width column                           |
| .col-8    | 66.667% | 8/12 width column                           |

| Class   | Width   | Description        |
|---------|---------|--------------------|
| .col-9  | 75%     | 9/12 width column  |
| .col-10 | 83.333% | 10/12 width column |
| .col-11 | 91.667% | 11/12 width column |
| .col-12 | 100%    | Full-width column  |

## Responsive Columns

| Class     | Breakpoint | Description                |
|-----------|------------|----------------------------|
| .col-sm-* | ≥576px     | Small screen columns       |
| .col-md-* | ≥768px     | Medium screen columns      |
| .col-lg-* | ≥992px     | Large screen columns       |
| .col-xl-* | ≥1200px    | Extra large screen columns |

## Flexbox Direction Classes

| Class                | Description                    |
|----------------------|--------------------------------|
| .flex-row            | Horizontal direction (default) |
| .flex-column         | Vertical direction             |
| .flex-row-reverse    | Horizontal direction, reversed |
| .flex-column-reverse | Vertical direction, reversed   |

## Flexbox Wrap Classes

| Class              | Description                      |
|--------------------|----------------------------------|
| .flex-wrap         | Allow items to wrap to next line |
| .flexnowrap        | Prevent wrapping (default)       |
| .flex-wrap-reverse | Wrap items in reverse order      |

## Justify Content Classes

| Class                    | Description                    |
|--------------------------|--------------------------------|
| .justify-content-start   | Align items to start           |
| .justify-content-end     | Align items to end             |
| .justify-content-center  | Center items                   |
| .justify-content-between | Space items evenly             |
| .justify-content-around  | Space items with equal margins |

## Align Items Classes

| Class                 | Description             |
|-----------------------|-------------------------|
| .align-items-start    | Align items to start    |
| .align-items-end      | Align items to end      |
| .align-items-center   | Center items            |
| .align-items-baseline | Align items to baseline |
| .align-items-stretch  | Stretch items (default) |

## Align Content Classes

| Class                  | Description                      |
|------------------------|----------------------------------|
| .align-content-start   | Align content to start           |
| .align-content-end     | Align content to end             |
| .align-content-center  | Center content                   |
| .align-content-between | Space content evenly             |
| .align-content-around  | Space content with equal margins |
| .align-content-stretch | Stretch content (default)        |

## Align Self Classes

| Class            | Description              |
|------------------|--------------------------|
| .align-self-auto | Auto alignment (default) |

| Class                | Description            |
|----------------------|------------------------|
| .align-self-start    | Align self to start    |
| .align-self-end      | Align self to end      |
| .align-self-center   | Center self            |
| .align-self-baseline | Align self to baseline |
| .align-self-stretch  | Stretch self           |

## Order Classes

| Class        | Description |
|--------------|-------------|
| .order-first | Order: -1   |
| .order-last  | Order: 13   |
| .order-1     | Order: 1    |
| .order-2     | Order: 2    |
| .order-3     | Order: 3    |

## Offset Classes

| Class      | Margin Left | Description          |
|------------|-------------|----------------------|
| .offset-1  | 8.333%      | Offset by 1 column   |
| .offset-2  | 16.667%     | Offset by 2 columns  |
| .offset-3  | 25%         | Offset by 3 columns  |
| .offset-4  | 33.333%     | Offset by 4 columns  |
| .offset-5  | 41.667%     | Offset by 5 columns  |
| .offset-6  | 50%         | Offset by 6 columns  |
| .offset-7  | 58.333%     | Offset by 7 columns  |
| .offset-8  | 66.667%     | Offset by 8 columns  |
| .offset-9  | 75%         | Offset by 9 columns  |
| .offset-10 | 83.333%     | Offset by 10 columns |

| Class      | Margin Left | Description          |
|------------|-------------|----------------------|
| .offset-11 | 91.667%     | Offset by 11 columns |

## Push/Pull Classes

| Class   | Description               |
|---------|---------------------------|
| .push-* | Push columns to the right |
| .pull-* | Pull columns to the left  |

## CSS Custom Properties

The Grid system uses standard CSS properties and doesn't rely on CSS custom properties. However, it's designed to work seamlessly with CSS custom properties for theming:

| Property               | Description            | Default                        |
|------------------------|------------------------|--------------------------------|
| --grid-gutter-width    | Width of grid gutters  | 30px                           |
| --grid-columns         | Number of grid columns | 12                             |
| --container-max-widths | Container max-widths   | 540px, 720px, 960px,<br>1140px |
| --grid-breakpoints     | Breakpoint values      | 576px, 768px, 992px,<br>1200px |

## Best Practices

### Layout Structure

- Container First : Always start with a container ( .container or .container-fluid )
- Row Wrapper : Wrap columns in a .row element
- Column Classes : Use appropriate column classes for desired widths
- Responsive Design : Use breakpoint-specific classes for mobile-first design

### Responsive Design

- Mobile First : Design for mobile devices first, then enhance for larger screens

- Breakpoint Strategy : Use consistent breakpoints across your application
- Progressive Enhancement : Start with basic layout, add complexity for larger screens
- Content Priority : Ensure important content is visible on all screen sizes

## Performance

- CSS Efficiency : Grid classes are optimized for performance
- Minimal Nesting : Avoid deeply nested grid structures when possible
- Semantic HTML : Use semantic HTML elements with grid classes
- Browser Support : Grid system works in all modern browsers

## Accessibility

- Logical Order : Ensure content flows logically regardless of visual order
- Screen Readers : Grid layout doesn't affect screen reader navigation
- Keyboard Navigation : Maintain logical tab order
- Focus Management : Ensure focus indicators are visible

## Content Organization

- Consistent Spacing : Use consistent gutters and spacing
- Content Hierarchy : Use grid to establish clear visual hierarchy
- Flexible Content : Design content to work across different column widths
- Responsive Images : Ensure images scale appropriately within grid columns

## Accessibility Guidelines

## Semantic Structure

- HTML Semantics : Use semantic HTML elements with grid classes
- Document Outline : Ensure proper heading hierarchy within grid layouts
- Landmark Roles : Use appropriate ARIA landmarks for major layout sections
- Content Flow : Maintain logical content flow regardless of visual layout

## Screen Reader Support

- Logical Order : Content should flow logically for screen readers
- Descriptive Labels : Use descriptive labels for interactive elements
- Skip Links : Provide skip links for navigation-heavy layouts
- Focus Indicators : Ensure focus indicators are visible and logical

# Keyboard Navigation

- Tab Order : Maintain logical tab order through grid layouts
- Focus Management : Ensure focus moves logically through content
- Keyboard Shortcuts : Provide keyboard shortcuts for complex layouts
- Escape Mechanisms : Allow users to escape from complex layouts

# Visual Design

- High Contrast : Ensure sufficient contrast ratios in grid layouts
- Color Independence : Don't rely solely on color for information
- Text Scaling : Support for text scaling and zoom
- Motion Sensitivity : Provide alternatives for users sensitive to motion

# Responsive Behavior

## Mobile Adaptations

The Grid system automatically adapts to mobile screens:

- Stacked Layout : Columns stack vertically on small screens
- Full Width : Single columns take full width on mobile
- Touch Optimization : Layouts are optimized for touch interaction
- Performance : Optimized performance for mobile devices

## Breakpoint Behavior

- Extra Small (0px+) : Single column layout, stacked content
- Small (576px+) : Multi-column layouts begin to appear
- Medium (768px+) : Tablet-optimized layouts
- Large (992px+) : Desktop layouts with full feature set
- Extra Large (1200px+) : Large desktop and wide screen layouts

## Content Considerations

- Flexible Images : Images scale appropriately within grid columns
- Text Readability : Text remains readable at all column widths
- Touch Targets : Interactive elements maintain appropriate touch target sizes
- Loading Performance : Layouts load efficiently on all devices